

## DINKY<sup>1</sup> COMPUTERS ARE CHANGING OUR LIVES

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Computers can now (or will soon be) found in cars, sewing machines, tombstones, typewriters, and pinball machines. The age of the abundant computer is here. As it completely unfolds we will think we have entered a land of science fiction. Dinky computers ✕ will permeate virtually all aspects of our lives. Computers will be used in old ways by people and businesses who couldn't afford them before and in many exciting new innovative ways that we couldn't even have thought of before.

Computers have been around for some time. Why all the fuss now about change? The answer is simple. We now realize that computers can be useful to individual people. A few years ago the price of a computer dropped past a threshold that caused a lot of people to understand that the computer was a personally useful tool. A few people understood before, but now that idea is so popular that it has some of the aspects of a religion. The idea of the personal computer certainly has a large and active following.

might find a computer useful in scheduling people or equipment. Some businesses will have applications specialized to their own business such as a personnel agency's maintenance and search of an applicant data base or a savings and loan company's calculation of amortization schedules. Innovative applications might include sales forecasting, electronic mail for ordering, building security, energy conservation, games as sales techniques and graphics in advertising displays.

A typical configuration for a small business computer system including 32K bytes of memory, dual floppy disks and a continuous forms printer costs less than \$5 per day when amortized over three years. Small businesses commonly find that a computer costing less than \$5 per day can replace one or more employees and can give the management more timely and accurate information than they were getting before. In general, the effect of the computer on the small business is to improve productivity while reducing costs primarily by reducing the number of employees

The changes brought about by dinky computers will be many and not all will be good. Change will be rampant in the computer industry. But few institutions or individuals will escape without change. Businesses both large and small, the U.S. economy, labor, women, the handicapped, the data processing professional, government, the U.S. Postal Service, and our educational system are among those that will be changed by dinky computers.

### Business, Labor, and the Economy

Small businesses can make use of dinky computers in a variety of ways--most of them scaled down versions of the same applications in big businesses. Applications common to most small business include: general ledger, accounts payable, accounts receivable, payroll, and inventory control. Some businesses will find a use for word-processing in the generation of letters and reports. Mailing list maintenance and label generation are popular computer uses. A small business

<sup>1</sup>Of the many words Ted Nelson has given us, this is one of the best.

in relatively unskilled positions. By reducing overhead an increasing number of small businesses will find themselves viable. This experience is not unique to small businesses but is the same as that of large corporations which preceded them in the use of business computers. Future applications could include conferencing and working at home.

The effects of the managers' use of the dinky computer will be many. The productivity of clerical employees will be increased. The effect of an easily accessible private computer will be to improve budgeting and project control techniques. Electronic mail will decrease the need for unskilled labor and decrease the use of the post office.

The same \$5 per day business computer system found so helpful in small businesses will also be useful to the manager in the large corporation. Now a manager at nearly any level can afford his or her own private computing resource. One of the first applications will be word processing for the preparation of letters, memos, and reports. Other immediate applications include: budgeting, project control, maintenance of specialized data bases, sales forecasting,

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scheduling, reminders, mailing or routing list maintenance, and electronic mail.

The overall effect of the use of low-cost computing in business will be an increase in national productivity and an improved economic position for the U.S. in the world marketplace. The U.S., as the undisputed leader in low-cost computing technology, will be able to use this technology as a principal weapon in any future economic war.

The labor force will experience both positive and negative effects of low-cost computing. On the positive side, there will be reduced need for people to do boring work. However, there will be a reduction in the demand for relatively unskilled labor such as clerical, mail service, and bookkeeping. Since most of these jobs are now filled by women, women will be hardest hit by the reduced demand for unskilled labor. Countering the increasing demand for programmers will be the fact that entry-level programmers will be in plentiful supply since low-cost computing will make computer education, even self-education, widely available.

Now computer-inventiveness is in the public domain. Before only large corporations and well-endowed universities could invent products containing computers. Now the man or woman on the street has economic access to computers and can use them in inventions. I'm sure they will. The same inventive talent that brought us the automobile and the electric light will bring us "intelligent" computer-based products that are now beyond our

data base and communications networks. This role will not be easy since departments will realize that information is power. The struggle over how to distribute the data base will be a power struggle between departments with DP caught in the middle.

Now that computers can be owned by individuals or dedicated to the use of an individual in a corporation, there is little need for time-sharing. In fact, time-sharing was invented as an attempt to give the illusion that each user had his or her own computer. Now that each user can have his or her own computer, time-sharing is no longer needed and the overhead required by sharing makes it uncompetitive. Present time-sharing customers will, of course, stay with time-sharing if they are locked in by software or data bases. Additionally, there are a few applications that may need resources too great for today's dinky computer.

The big computer will not go down without a fight. We can expect to see significant price cuts in order to keep the gargantuan machine alive. But ultimately the giants will be kept only to run programs too hard to change. Most new architectures will be based on unshared computers, shared large disks, and shared fast peripherals connected into networks. The heyday of distributed computing will have arrived.

The new computer industry will see many opportunities. Computer manufacturing and distribution will be feasible small businesses. The new small companies with low overhead will





hardware is now affordable. Many people will even teach themselves how to program. The new dinky computers are interactive and much easier to program than big batch computers. All this could lead to a decrease in the salary-level of entry-level programmers. Ultimately this must affect other levels.

As the public becomes more and more knowledgeable about computers, the job of the data processing professional will seem much less glamorous and mysterious and much more just an ordinary job. This will have more than just an ego deflating effect on the profession. A computer-literate public will demand that the programming job be done properly with the good of the public an objective. We can expect to see a public demand for legislation to control computer usage and programmer qualifications. As the public becomes more aware that they are becoming increasingly dependent on unproven computer technology, our profession may find itself in the fish bowl of public controversy.

### Government

Government at all levels will experience most of the problems and opportunities of businesses. In addition, government will face some unique changes. The increasing use of electronic mail will bring about further declines in the use and efficiency of the U.S. Postal Service. Government may be able to reduce the demand for energy by encouraging the

defending the universe against klingons. The strategies and events are intricate and demanding requiring quick and correct decisions. Computer games are often intellectually stimulating as well as just plain fun. Although the computer games encourage socialization to an even less extent than television (there are no commercials), at least they involve the player in the activity unlike passive television-watching.

Besides games, the computer offers other opportunities for entertainment and creativity via computer-generated art and music. For several years a few artists and musicians have experimented with the computer as a tool for creativity and expression. Now the computer as an artist's tool is available to many.

The low-cost computer coupled with video disk technology could do much to increase the availability and flexibility of personalized education. These new technologies make high-quality computer-assisted instruction techniques affordable by educational institutions, libraries, corporations, and individuals. The place of education may become much more flexible. The role of the educational institution may change to primarily that of preparing courseware and certification of knowledge or skill levels.

Computers can be used in many ways to improve the lives of the handicapped. A person without arms or legs could control a wheelchair by voice commands. A blind person

use of computers to control and conserve energy usage in homes and industry. Crime can be decreased through the use of computerized security systems. The cost of political campaigns may be decreased by applying low-cost computing to the data processing tasks involved in a campaign. Government must help solve the problem of protection for the author's rights in mass-produced software. Increasing displacement of unskilled labor by computers will be a difficult governmental problem. New legislation may be required to control computer technology. Finally, our government will be faced with the new ghetto of the computer "have-nots."

### The Individual

All the changes previously mentioned affect us to some extent individually. There are other effects, however, that deserve mention.

The computer brings us a new form of entertainment. It is entertainment through the simulated experience. Often called computer games, this form of entertainment can offer very challenging and highly involving activities. The most popular game of this class is Star Trek. It lets one pretend to be captain of a star ship charged with

might use a typewriter, computer terminal, or calculator that speaks each letter or number. A deaf person might use a telephone that visually displays messages. A speech-impaired person might use a speech synthesis device that spoke what was entered at a keyboard. The possibilities are exciting and many.

In the gizmo age we will be surrounded by "intelligent" devices ranging from the self-dialing phone to the self-flushing toilet. Most of these devices will be helpful and friendly, but not all. The computer-generated junk phone call is with us. A computer-based device can place calls, play a recorded message, record a response, and even accept touch-tone input of a credit card number for a purchase. The unlisted number doesn't help since the device could place calls to all the numbers having a certain prefix--a very inexpensive way of placing calls to a part of town corresponding to a certain economic level. The devilish device could remember that you didn't answer and call until you do. It could even remember that you hung up and pester you until you listen. Unfortunately, junk telephone calls are a fraction of the cost of junk mail. A bill has already been introduced in the Congress to control this nuisance made possible by dinky computers.

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What will be next?

Low-cost computing will add fuel to the already threatening invasion of individual privacy. Abundant dinky computers mean data bases too numerous to control. An individual won't have a chance of knowing whose keeping what records about him or her. Cheap computers will mean increased feasibility of surveillance of individuals by government or business. The IRS might be able to check, in detail, every tax return. Isn't that exciting!

### Conclusion

We've surely only glimpsed the brave, new world being created by dinky computers. The next few years will be more exciting and probably less believable than most science fiction. I want to be there as it happens. Perhaps I can help . . . . .

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